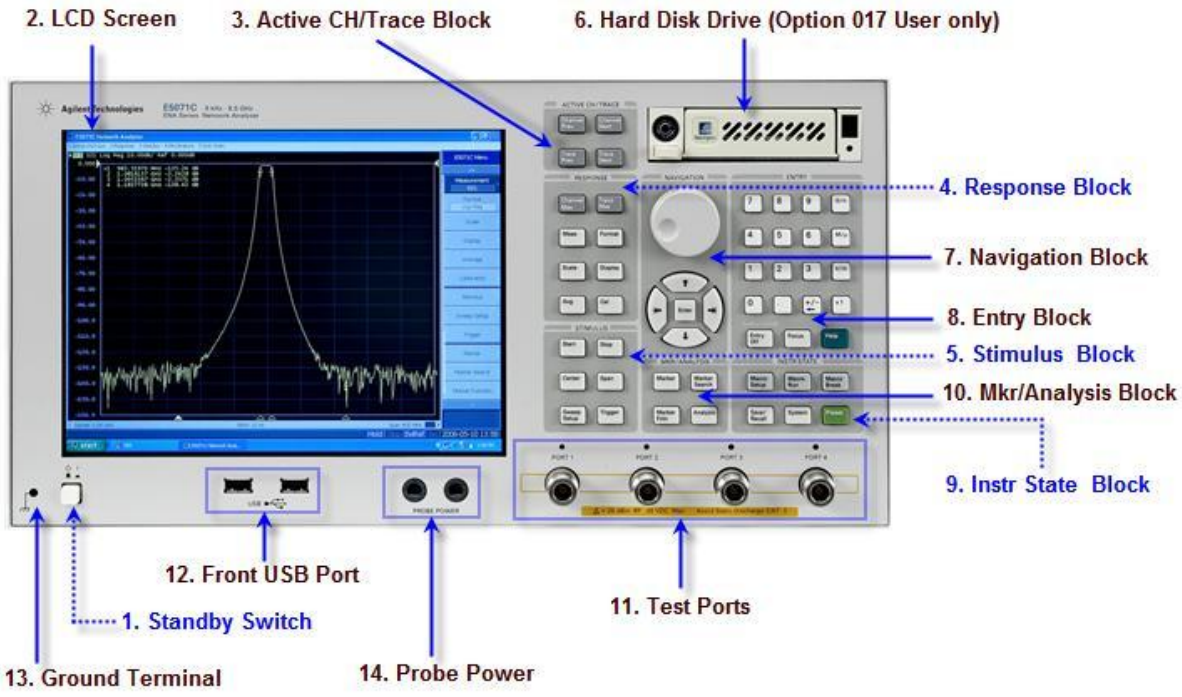
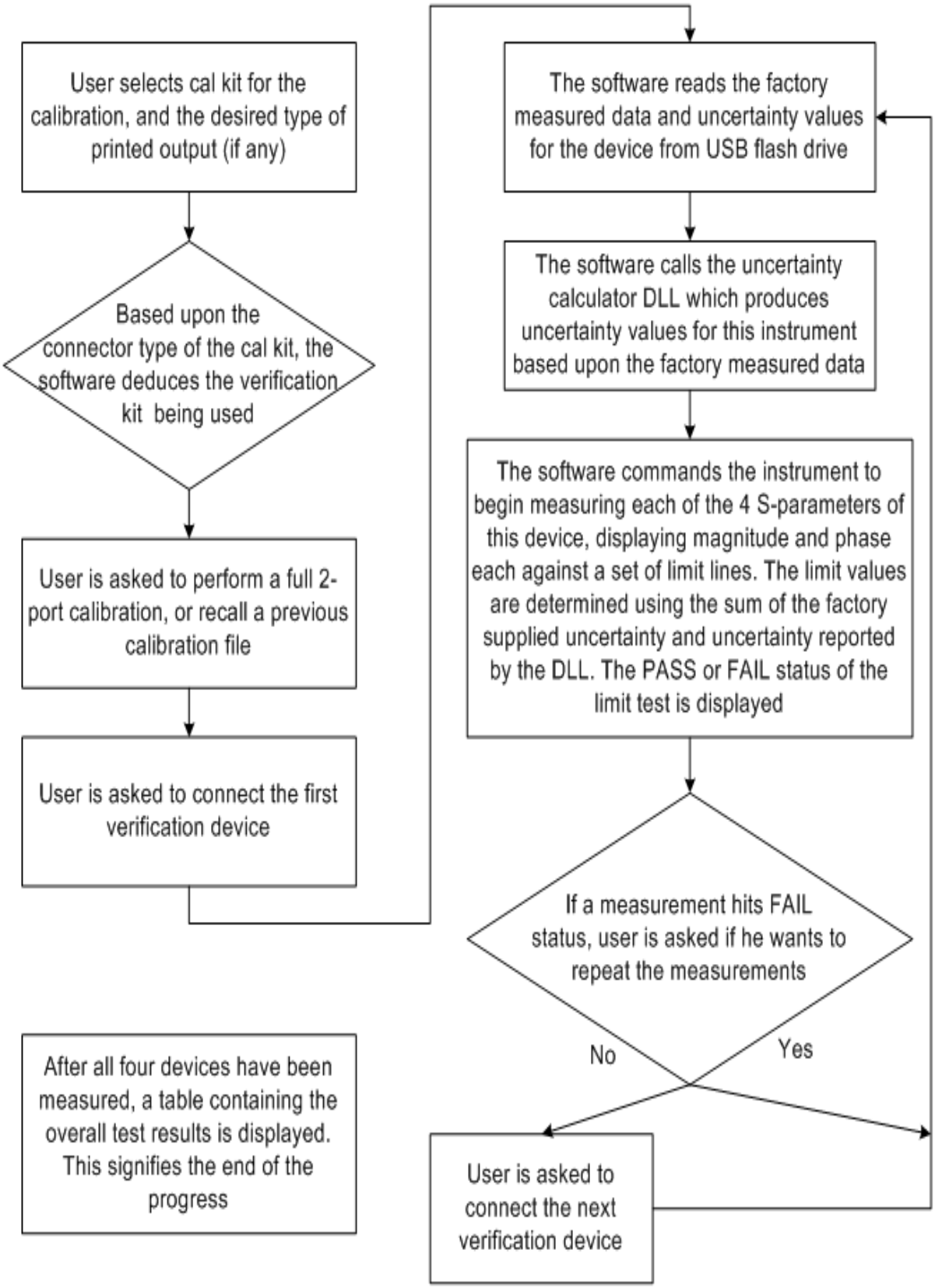
# AGILENT E5071C
# ENA NETWORK ANALYZER



## Flow Diagram of Procedure

The operational flow of the software is depicted by the flowchart shown below.


User selects cal kit for the calibration, and the desired type of printed output (if any)
Based upon the connector type of the cal kit, the software deduces the verification kit being used
User is asked to perform a full 2-port calibration, or recall a previous calibration file
User is asked to connect the first verification device
The software reads the factory measured data and uncertainty values for the device from USB flash drive
The software calls the uncertainty calculator DLL which produces uncertainty values for this instrument based upon the factory measured data
The software commands the instrument to begin measuring each of the 4 S-parameters of this device, displaying magnitude and phase each against a set of limit lines. The limit values are determined using the sum of the factory supplied uncertainty and uncertainty reported by the DLL. The PASS or FAIL status of the limit test is displayed
If a measurement hits FAIL status, user is asked if he wants to repeat the measurements
No
Yes
User is asked to connect the next verification device
After all four devices have been measured, a table containing the overall test results is displayed. This signifies the end of the progress

## Basic Calibration

- Before executing calibration, you need to select a calibration kit. If you use a calibration kit other than a predefined one, you need to define it. If the connector type of the standard of the calibration kit you use has polarity (the distinction between male and female), you need to change the standard class definition of the calibration kit depending on the standard you actually use. For more information, see Modifying Calibration Kit Definition.

- If you select a predefined calibration kit, (m) and (f) in the name (label) of the standard displayed in the soft key indicate male (m) and female (f) for the analyzer's connector, respectively.

- Click **Select Port**.

- **For 1-port;**
  - ✓ In 1-port calibration, calibration data are measured by connecting an OPEN standard, a SHORT standard, and a LOAD standard to the desired test port. This calibration effectively eliminates the frequency response reflection tracking error, directivity error, and source match error from the test setup in a reflection test using that port.

1. Press **Cal** Key.
2. Click **Cal Kit**, then select the calibration kit.
3. If the name (label) of the calibration kit has been changed, the label is displayed as the soft key.
4. An asterisk (*) on the upper right of the softkey corresponding to a predefined calibration kit indicates that its definition value has been changed from the factory setting by the user.
5. Click **Calibrate**.
6. Select a test port (and corresponding S parameter) on which 1-port calibration will be performed.
7. Connect an OPEN calibration standard to the selected test port (connector to which the DUT is to be connected).
8. Click **Open** to start the calibration measurement.
9. Connect a SHORT calibration standard to the selected test port (connector to which the DUT is to be connected).
10. Click **Short** to start the calibration measurement.
11. Connect a LOAD calibration standard to the selected test port (connector to which the DUT is to be connected).
12. Click **Load** to start the calibration measurement.
13. Click **Done** to terminate the 1-port calibration process. Upon pressing this key, calibration coefficients will be calculated and saved. The error correction function will also be automatically enabled.

- **For 2-port;**
  - ✓ In full 2-port calibration, calibration data are measured by connecting an OPEN standard, a SHORT standard, or a LOAD standard to two desired test ports (or a THRU standard between two ports).This calibration effectively eliminates the directivity error, crosstalk, source match error, frequency response reflection tracking error, and frequency response transmission tracking error from the test setup in a transmission or reflection test using those ports. This calibration

makes it possible to perform measurements with the highest possible accuracy. A total of twelve error terms, six each in the forward direction and the reverse direction, are used in a calibration.

1. Press **Cal** key.
2. Click **Cal Kit**, then select the calibration kit.
3. If the name (label) of the calibration kit has been changed, the label is displayed as the soft key.
4. An asterisk (*) on the upper right of the softkey corresponding to a predefined calibration kit indicates that its definition value has been changed from the factory setting by the user.
5. Click **Calibrate** > **2-Port Cal**.
6. Click **Select Ports**, then select the test ports on which you will perform full 2-port calibration. (In the procedure below, the selected test ports are denoted as x and y.)
7. Click **Reflection**.
8. Connect an OPEN calibration standard to test port x (the connector to which the DUT is to be connected).
9. Click **Port x Open** to start the calibration measurement (**x** denotes the test port to which the standard is connected).
    - If you select the calibration kit which has different calibration definitions for each gender, (m) and (f) in the name (label) of the standard displayed in the softkey indicate male (m) and female (f) for the analyzer's connector, respectively.
10. Disconnect the OPEN calibration standard and replace it with a SHORT calibration standard.
11. Click **Port x Short** to start the calibration measurement (**x** denotes the test port to which the standard is connected).
12. Disconnect the SHORT calibration standard and replace it with a LOAD standard.
13. Click **Port x Load** to start the calibration measurement (**x** denotes the test port to which the standard is connected).
14. Repeat the above procedure for port y.
15. Click **Return**.
16. Click **Transmission**.
17. Make a THRU connection between ports x and y (between the connectors to which the DUT is to be connected).
18. Click **Port x-y Thru** to start the calibration measurement (**x** and **y** denote the test ports between which the THRU connection is being made).
19. Click **Return**.
20. If an isolation calibration must be performed using a LOAD standard, follow the procedure below.
21. Click **Isolation (Optional)**.
22. Connect a LOAD standard to each of the two test ports (connectors to which the DUT is to be connected).
23. Click **Port x-y Isol** to start the calibration measurement (**x** and **y** denote the port numbers to which the LOAD standard is connected).
24. Click **Return**.
25. Click **Done** to terminate the full 2-port calibration process. Upon pressing this key, calibration coefficients will be calculated and saved. The error correction function will also be automatically enabled.

# Safety

## Safety Summary

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual may impair the protection provided by the equipment. Such noncompliance would also violate safety standards of design, manufacture, and intended use of the instrument. Agilent Technologies assumes no liability for the customer's failure to comply with these precautions.

Notes;

- The E5071C complies with INSTALLATION CATEGORY II as well as POLLUTION DEGREE 2 in IEC61010-1. The E5071C is an INDOOR USE product.
- The LEDs in the E5071C are Class 1 in accordance with IEC60825-1, CLASS 1 LEDPRODUCT

■ Ground the Instrument - To avoid electric shock, the instrument chassis and cabinet must be grounded with the supplied power cable's grounding prong.

■ DO NOT Operate in an Explosive Atmosphere - Do not operate the instrument in the presence of inflammable gasses or fumes. Operation of any electrical instrument in such an environment clearly constitutes a safety hazard.

■ Keep Away from Live Circuits - Operators must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltage levels may remain even after the power cable has been disconnected. To avoid injuries, always disconnect the power and discharge circuits before touching them.

■ DO NOT Service or Adjust the Instrument Alone - Do not attempt internal service or adjustment unless another person, capable of rendering first aid and resuscitation, is present.

■ Dangerous Procedure Warnings - Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed.

■ Dangerous voltage levels, capable of causing death, are present in this instrument. Use extreme caution when handling, testing, and adjusting this instrument.

### Safety Symbols

Instruction Manual symbol: the product is marked with this symbol when it is necessary for the user to refer to the instrument manual.

Alternating current.

Direct current.



On (Supply).

Off (Supply).

In-position of push-button switch.

Out-position of push-button switch.

A chassis terminal; a connection to the instrument's chassis, which includes all exposed metal structure.

Stand-by.